

Our Newest Teammate:
Integrating Artificial
Intelligence Into Family
Medicine

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Learning Objectives

Upon successful completion of this lecture, the attendee will be able to:

- Briefly discuss the history of technology in medicine
- Recognize the technological basis of current artificial intelligence systems
- Identify myths, misperceptions, and limitations regarding artificial intelligence use within healthcare
- Consider potential uses of artificial intelligence within healthcare and their implications on the practice of Family Medicine

London Medical and Physical Journal, 1821

“... I have no doubt whatever, from my own experience of its value, that it will be acknowledged to be one of the greatest discoveries in medicine by all those who are of a temper, and in circumstances, that will enable them to give it a fair trial. That it will ever come into general use, notwithstanding its value, I am extremely doubtful; because its beneficial application requires much time, and gives a good deal of trouble both to the patient and the practitioner; and because its whole hue and character is foreign, and opposed to all our habits and associations.

It must be confessed that there is something even ludicrous in the picture of a grave physician formally listening through a long tube applied to the patient's thorax, as if the disease within were a living being that could communicate its condition to the sense without.”

-John Forbes M.D.

Physician to the Penzance Dispensary

TECHNOLOGY IN MEDICINE (1600 – 1900)

Late 17th
century
Microscope

1796 - Edward
Jenner's
smallpox
vaccine

1821-
Stethoscope
Introduced by
Rene Laennec

1846 - William
Morton's
demonstration
of ether
anesthesia

1895 - Wilhelm
Roentgen's
discovery of X-
rays

TECHNOLOGY IN MEDICINE (>1900)

1928 -
Alexander
Fleming's
discovery of
penicillin

1954 first
successful
kidney
transplant by
Joseph Murray
and colleague)

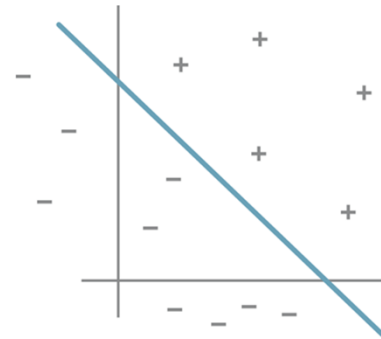
1970's-
Introduction of
CT/MRI
/Ultrasound

1985- first robot-
assisted surgery;
PUMA 560

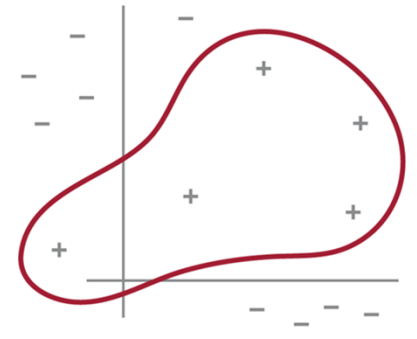
2003 Human
Genome Project
completed

How AI “Thinks”

Linear classifiers



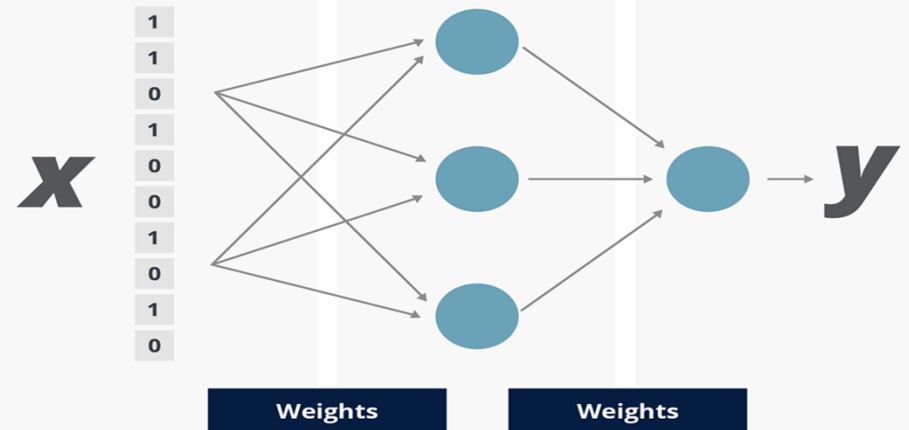
Complex classifiers



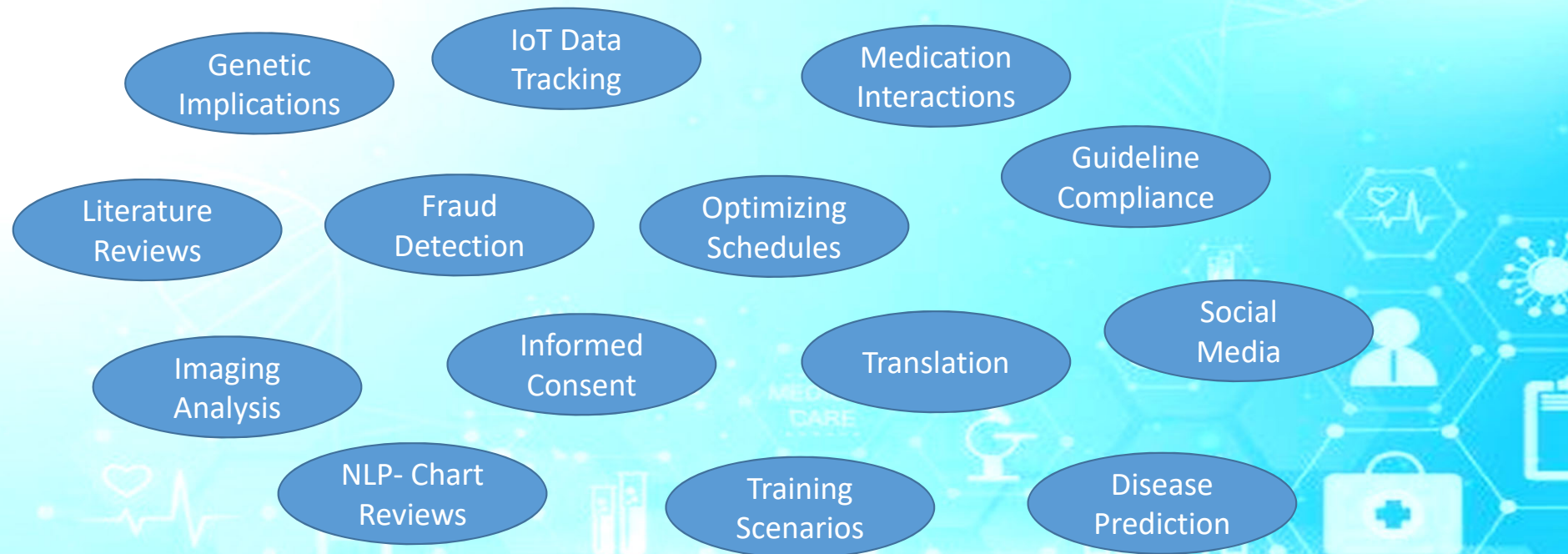
Input layer

Hidden layer(s)

Output layer



What is AI Good At?



Artificial Intelligence Myths

- “I can use pre-built, ‘off the shelf’ algorithms to create AI”
- “Artificial Intelligence is likely to introduce hidden biases into the data outputs”
- “AI creates ‘black-box answers’ that are beyond human understanding”
- “If AI is more accurate than human diagnoses, it should be able to drive clinical decisions”

Can Artificial Intelligence “Practice Medicine”?

While the official definition of the “Practice of Medicine” is determined by individual licensure boards, the definition generally comes down to the line between “giving advice” and “diagnosis and treatment.” This is typically based on 4 factors:

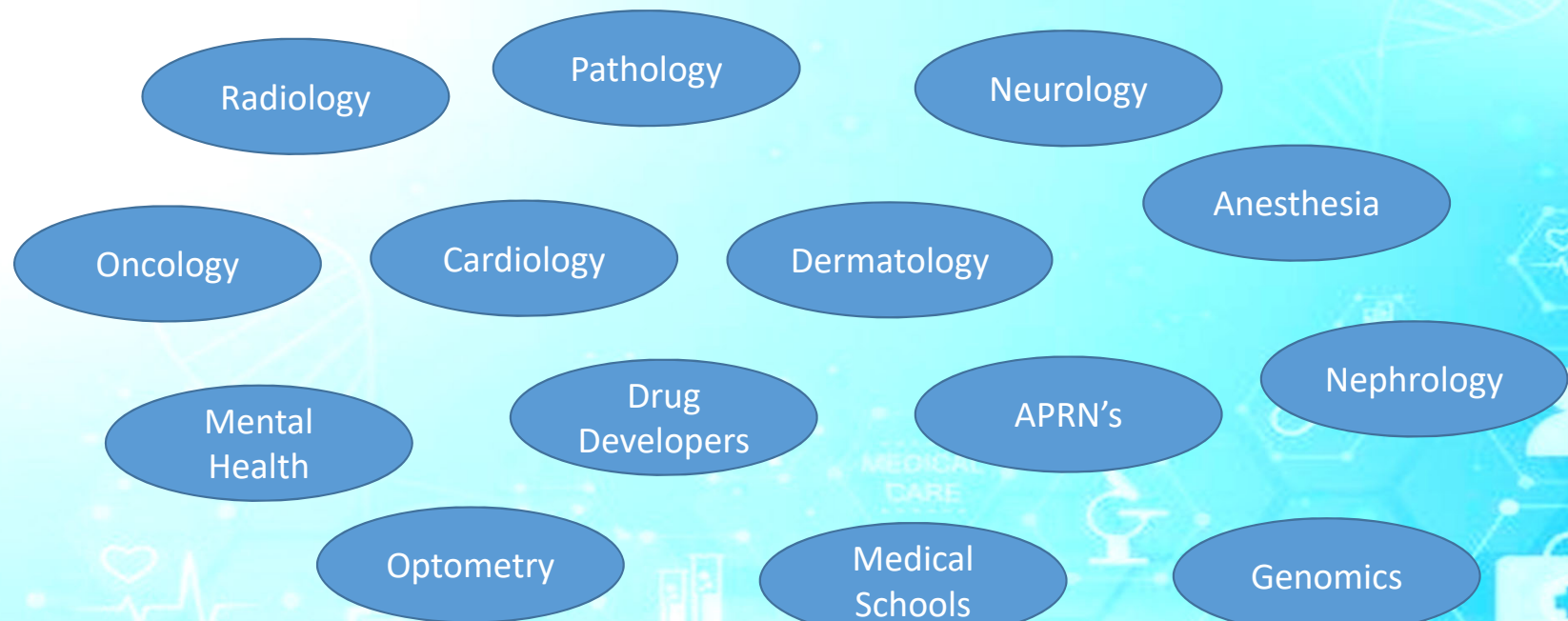
Generalized versus personalized application of information?

Is there a direct relationship?

Are specific medications or treatments recommended?

Does the jurisdiction require a license for the actions?

Who Should Be Nervous?

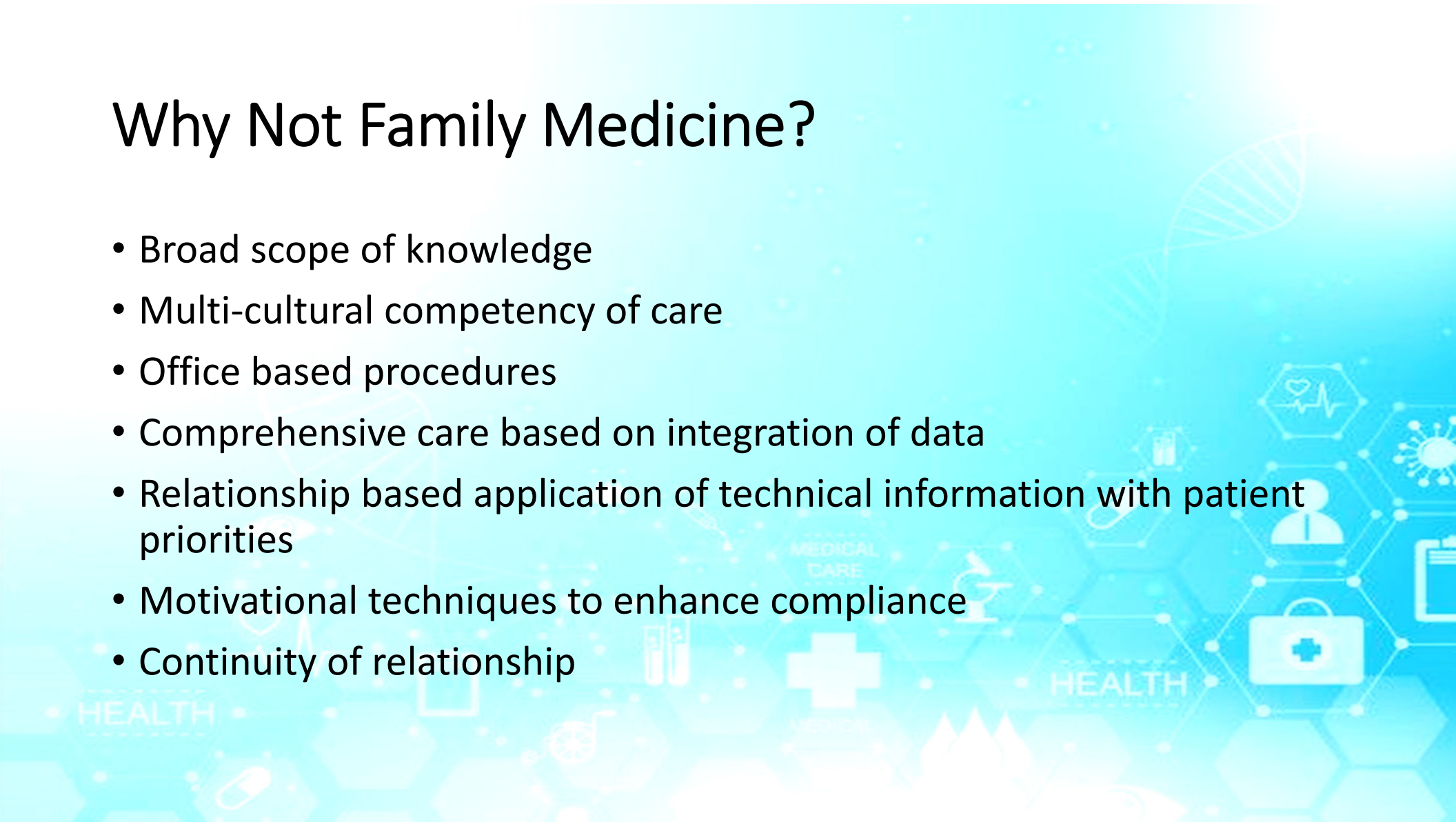




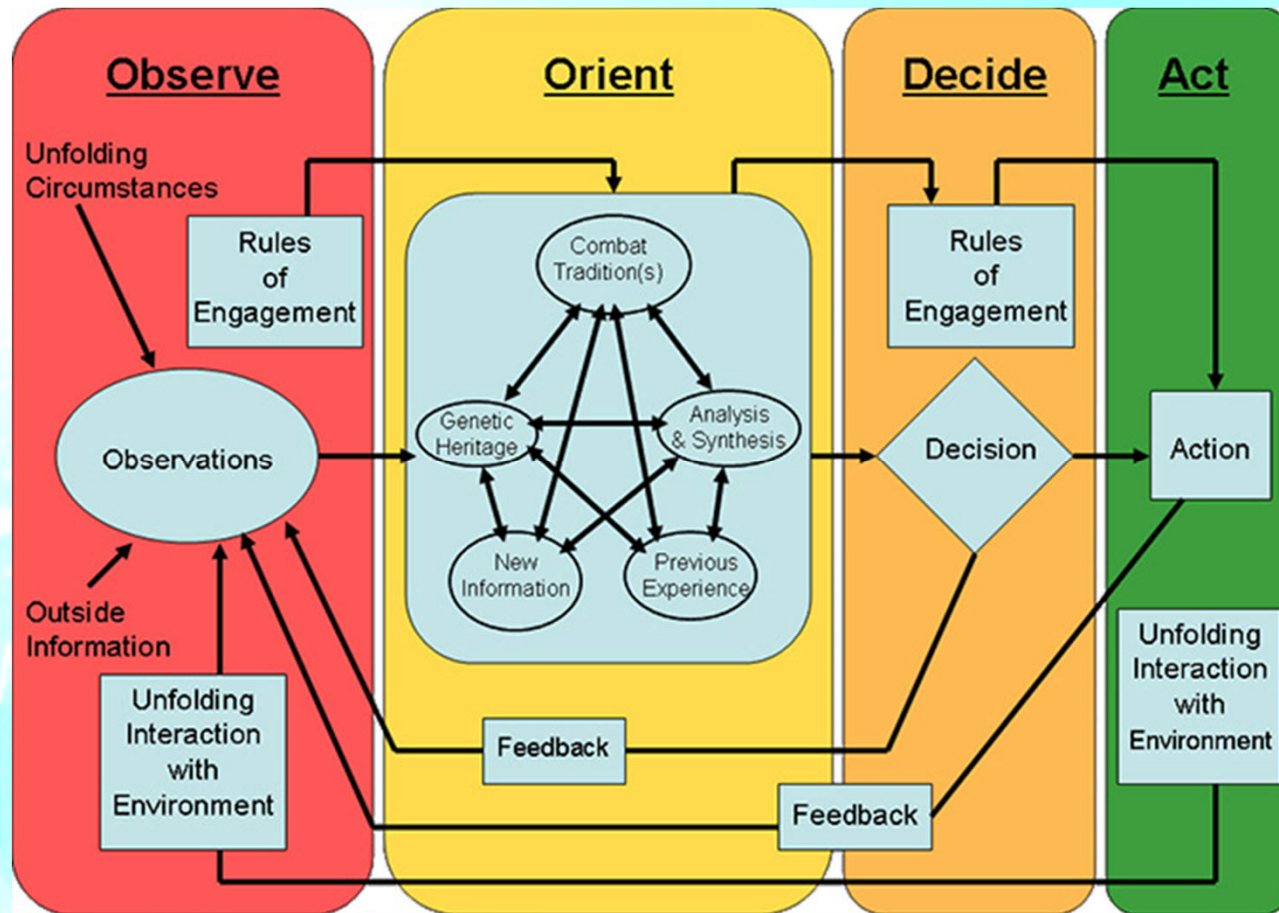
What is the Future of AI in Family Medicine?

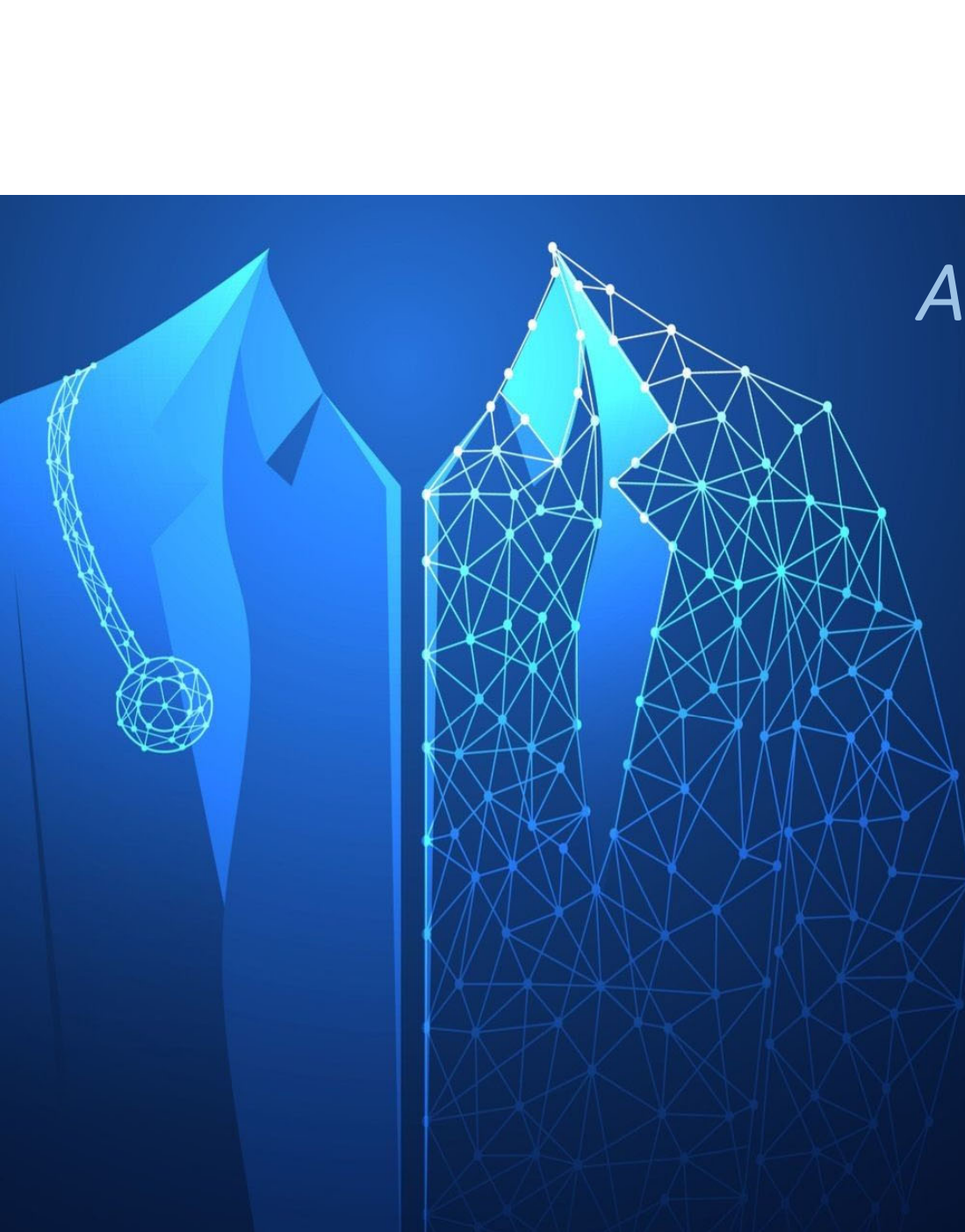
Why Not Family Medicine?

- Broad scope of knowledge
- Multi-cultural competency of care
- Office based procedures
- Comprehensive care based on integration of data
- Relationship based application of technical information with patient priorities
- Motivational techniques to enhance compliance
- Continuity of relationship



How do we effectively “target” AI?





AI as a Digital Teammate

- Observations
 - IoT Data Summary
 - Skin Lesions
- Orientations
 - Prior Auth / Formulary
 - Genomic Responses
- Decisions
 - Tailored Regimens
 - Intervention Impact Rankings
- Actions
 - Documentation / Follow-Up
 - Lab/Imaging tracking / Interp
 - Predictive Text Messaging

Questions / Discussion

The background is a light blue gradient with a hexagonal pattern. It features various medical icons: a DNA double helix, a heart with an ECG line, a microscope, a pill, a person icon, a first aid kit, a clipboard, a stethoscope, and a virus. Text elements include 'HEALTH' in a dashed box, 'MEDICAL CARE' in a dashed box, and 'MEDICAL' in a dashed box.

Legal Implications of AI Errors in Healthcare

- **Medical Malpractice:** If a physician follows incorrect information and it results in patient harm, the patient or their family may file a medical malpractice lawsuit against the physician. To succeed in a medical malpractice case, the patient typically needs to prove that the physician breached the standard of care expected of a reasonable and competent medical professional and that this breach caused the harm.
- **Product Liability:** In some cases, the developer of the AI might face product liability claims if the outputs are considered a defective or dangerous product. Product liability laws vary by jurisdiction, but they generally address injuries caused by defective products, including informational products like books.
- **Negligence:** If a developer is found to have been negligent in verifying or fact-checking the accuracy of AI outputs, they may be held liable for any harm caused to patients or other users of the AI.
- **False Representation:** If the information delivered by the AI is intentionally false or misleading, the developer could potentially face claims of false representation or fraud.
- **Regulatory Consequences:** Depending on the jurisdiction and the specific circumstances, the developer may face regulatory consequences from medical boards, government agencies, or other professional organizations responsible for overseeing medical practice and publishing standards.
- **Class Action Lawsuits:** In cases where multiple patients are harmed due to the same incorrect information in an AI, a class action lawsuit might be brought against the developer.
- **Defamation:** If the incorrect information in the medical AI harms the reputation of the physician who relied on it, the physician may bring a defamation claim against the developer.